Notebook, 1887

This notebook covers the period May-June 1887. Most of the book contains instructions from Edison, in the hand of Mina Miller Edison, to H. De Coursey Hamilton regarding proposed filament experiments. Notes from the experiments themselves, which were probably conducted at the Edison Lamp Works in Harrison, N.J., can be found in N-87-05-09, N-87-05-13, and N-87-06-01. There are also brief entries by Edison concerning phonograph cylinders and duplicating ink. The book contains 249 numbered pages, most of which are blank.

Blank pages not filmed: 1, 20-249.

May 7/87

Mina -

Hamilton -

You are to try the following experiments, all of which will require several weeks time and very careful manipulation otherwise they will not be of very much value -

The experiments are; the bringing up of the bamboo filaments quickly and also gradually in liquids, etc. in sealed glassed tubes thick enough to withstand the pressure which will move from a temperature 600 deg. fah. - These glass tubes should be about 1/8 of an in. thick and 1/2 to 2 in. in diameter, closed at one end by fusion, like a test tube, the other end should be open to permit the insertion of the filaments, which must be secured in carbon or metal receptacle so filament does not touch the sides of the glass tubes and so they will not float to top in the liquid or when a solid in powdered form become a liquid - Enough material should be used to cover the filaments entirely when the tube is at an angle of, say, 30 degs.

After liquid or powder etc. is put in tube and everything ready it is to be taken in to Joe Grace and sealed, the end being

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Mina -

Hamilton

drawn out to a point so that when the experiment is finished the tip can be broken off to allow of the escape of the gases slowly. When the tube is to be crooked bel point where it has full diameter, the filaments taken out and soaked in a warm solvent of the material used. For instance: if asphalt was the material used then the filaments can be washed in considerable quantity of Benzol slightly warmed on sand bath. If linseed oil a large quantity of turpentine will dilute it so that filaments when taken out will have practically no linseed oil on them and the turpentine will evaporate. If sugar then water will dissolve it. Always use a considerable quantity of water or other solvent to wash the filaments. A chamber should be used which will hold say 3 to 6 tubes and heated by a gas stove or other means. A Fahr. thermometer should enter the chamber. The bulb hung amid the tubes so it will get same heat as they do. The column should appear outside the chamber when mercury stands at 100 degrees. The thermometer should be capable of indicating up

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Mr. Hamilton -

to 600 degrees. A very long one is not necessary, one about 12 in. long is sufficient and are not so expensive -
The chamber should be arranged so that the temperature can be regulated very nicely - So that starting at 100 deg. Fahr. it will go gradually up to 600 deg. in 8 hours also be able to go to 600 deg. inside of an hour -
As I desire to make some experiments rapid and slowly -
Should any tube explode the chamber will prevent the broken glass from coming in contact with the eyes.
The carbons to be used are regular 8×1 3/2 with the shanks on same as now -
About 25 filaments should be put in each tube, except in the case where you put regular forms in, then 3 can be put in each form and three (3) forms used - making 9 carbons - You can get instructions from me as to best method of putting the filaments together for placing in the tube -
After washing and drying the filaments they are to be placed in the little paper boxes with the number marked on the top and

May 7/07

Ithaca

Hamilton -
also on a slip in the box - Each experiment should be given a number thus; Hamilton Experiment No 1 -
Variation No 6 -
The tube experiments being called No 1 Experiment and each tube a Variation with a number -
There will be duplicate tubes in every experiment, one of the tubes containing the same material as the other will be gradually run up temperature from the temperature of the atmosphere to 600 degs. Fahr. gradually during 8 hours. While the other tube which is a duplicate will be run up to 600 deg. in one hour or as near that as possible - I shall require about 60 pairs of tubes all of which will be 1 1/2 in. diameter inside measurement 1/8 of an in. thick - Have the tubes made it immediately so as to have it by the time your furnace is ready.
He will obtain for you a thermometer -
Anything relating to making furnace speak to me and I will have it made.
All the paper notes containing rules numbers are to be delivered to me -

May 7/87
Mina

Hamilton -

The following are the materials to be placed in the tubes: Please see if we have them all if not make list so they can be ordered immediately -

No 1 - Boiled Linseed oil
" 2 - Gincery
" 3 - Pure undiluted glycerine
" 4 - Phenol (or) Carbolic acid
" 5 - Paraffine
" 6 - Good Tar
" 7 - Powdered Rosin, 60 mesh -
this should be enough of powder put in tubes, so that when it melts it will cover the filaments fully -
No 8 - Acetic Acid - glacial
" 9 - 50 parts by weight of asphalt dissolved in 50 parts by weight of Linseed Oil -
No 10 - Powdered Asphalt, 60 mesh.
" 11 - Aniline Oil -
" 12 - Powdered sugar - this is sold in grocery under name of, pulverized sugar, and is very fine -
No 13 - 50 parts by weight of sugar and 50 parts water -
No 14 - Pine water.

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Hamilton -

No 15 - Saturated chlorine water

" 16 - 5 percent solution of Caustic Potash in water -

No 17 - 5 percent solution of sulphuric acid in water -

No 18 - Iodoform

" 19 - Flowers of sulphur -

" 20 - Powdered fusible metal 10@20 mesh -

Formula 4 parts Bismuth
1 part Cadmium
2 " of Lead
1 " " tin.

These are previously fused together and then powdered. I think it is little if not you can cut it up. It melts about 175 deg. Fahr.

See that we have a supply of material sufficient to make 4 or 5 times the quantity needed -

No 21 - Trichloride of Antimony -

" 22 - Anthracene

" 23 - Powdered sulphide of Potassium

" 24 - 5 percent. solution of Chromic Acid in water -

" 25 - 5 percent. solution of Nitric Acid

No 26 - Water 93 percent. Caustic Potash

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Illinois

Hamilton
No 25 - 5 parts pyrogallic acid
2 "
No 26 - 5 parts Caustic Potash
2 " pyrogallic Acid
" 27 - Chloride of Lime fresh
20 parts
Water 80 parts -

" 28 - Water 90 parts
Hydrofluoric Acid 10 parts
Be very careful in handling the Hydrofluoric acid, not to fill any on your fingers or body, it neutralized Olive Oil after dilution with water it is not dangerous -

I will probably give you other solutions in addition before the end of the experiment -

Additional experiments with tubes -
In this case the tubes are to have their tips broken off before heating so that there will be no pressure in them on heating - Only those substances are to be used which do not boil below 500 degs Fah. - Such substances will be:
Grading, Linseed Oil, Carbolic acid, Dark Tar Rosin, Glycerine, Asphalt, Rosin Rosin Flour Sulphur, fusible metal, Anthracine

May 8/87 Mina

Hamilton –
To add to sealed tube exptl. leaving off note 28th No.
No 29 Iodine Monochloride or Trichloride – Liquid at 70° Fahr. boils 213 Fahr.
No 30 – Pentachloride phosphorus – Melts under pressure at 298 Fahr. and boils about same point –
No 31 – Amorphous Phosphorus – Boils at 511 C under pressure of 400 lbs. Sgr. melt in sealed tube –
No 32 – Iodine in tube melts 220 Fahr.

H.H "1 Boiled Linseed Oil. 600° 1 hour
H.H.V "1 " " " " 8"
H.H "2 Glycerine 600° 1 hour.
H.H. "3 Paraffine " "
H.H.V "3 " 600° 8"
H.H "4 ½ Linseed ½ Asphaltum 600° 1½
H.H V "4
H.H "5 Mercury 600° 1 hour.

(H "1) V.1
2
H "1, V. 1
H "1 V 2

Cylinder for phonograph

June 22 1887

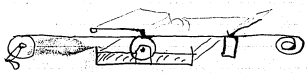
Take split mould you used for Plaster paris. & mould following substances

Melt Asphalt in Crucible pour —
Melt " mixed with equal quantity Kaolin or Chalk
Melt Rosin mixed with ¼ weight of bulk of Asphalt.
Melt Rosin mixed with ¼ weight Chalk or Kaolin
" " " ½ " " "
Melt Paraffine mixed with ½ its bulk Rosin
Melt " " ½ " Chalk or Kaolin
"

T28

Duplicating Ink —

Aniline Violet in water strong solution mixed with gum tragacanth, various proportions of each
Write on good writing paper, after drying, transfer to Blotting paper moistened, then from the ~~stake~~ the duplicate,

Paraffine paper Mimeograph

Rig up a Vat for Covering paraffin paper on one side only